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(See inside cover)

PHOTOGRAPHIC
INTERPRETATION
REPORT

NATIONAL PHOTOGRAPHIC
INTERPRETATION CENTER

POLISH EARLY WARNING RADAR DEVELOPMENTS

Top Secret

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JUNE 1977

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POLISH EARLY WARNING RADAR DEVELOPMENTS

ABSTRACT

1. This report discusses the two known Polish radar equipment production plants, the facility where the equipment is tested, the types of Polish early warning (EW) radar equipment, and the hardening of EW and ground control intercept radar sites. This report is current through the information cutoff date of 15 April 1977.

INTRODUCTION

Production Plants and Test Facility

2. The Polish radar industry began in 1953 with the building of the Warszawa Radar Works T1 [redacted] It has since been expanded to include Zielonka Electronic Equipment Plant [redacted] approximately 5 nautical miles (nm) northeast of T1. A radar test facility, Warszawa Unidentified Installation Nadma [redacted] is also in the Warsaw area. Most of the design, development, production, and test work for radar systems is done at these three facilities.

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Equipment

3. To date, the Poles have built and deployed three truck-mounted EW radars. The BILL FOLD was developed in the late 1950s; this development was superseded by the FARM GATE radar in 1968. In 1974 the JAW GATE became operational. All of these EW radars have been mounted on Czechoslovakian-built TATRA trucks.

4. A height finder radar is usually deployed with each EW radar. The height finders were developed in the same period as the EW radars. The NYSA-B height finder is usually deployed with the BILL FOLD. The GATE POLE/FARM GATE has superseded the NYSA-B/BILL FOLD pair. A height finder, which may have been designed to accompany the JAW GATE, was seen at the T1 factory in early 1973, [redacted]

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Early Warning/Ground Control Intercept Radar Site Hardening Program

5. Since about 1971 the Poles have constructed bunkers to house equipment at 36 EW/ground control intercept (GCI) radar sites (Figure 1). Thirteen of these sites have three bunkers, nine sites have a single bunker with entrances at both ends, and 14 sites have a single bunker that is open on one side. The development of new equipment and the hardening of the radar sites indicate a continuing program of improvement of Polish air defense capabilities.

BASIC DESCRIPTION

Production Plants and Test Facility

6. Warszawa Radar Works T1 is one of the main production plants for radar systems. A detailed study of the number of pieces of and types of equipment produced and maintained cannot be made from the available photography; however, numerous van trucks and possible radar-associated vehicles have occasionally been parked in the open.

[redacted]

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8. The radar systems are tested at the Warszawa Unidentified Installation Nadma (Figure 4). This installation is in a wooded area approximately 8.5 nm northeast of Warsaw. A masonry radar test tower [redacted] and two clutter screens used to reduce interference during antenna testing are prominent features at this facility. The JAW GATE antenna, which was mounted on the test tower, [redacted]

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Table 1. Polish Hardened Radar Sites

Name	BE No	Coordinates
POMERANIAN MILITARY DISTRICT		
Three-Bunker Sites		
Wladyslawowo		54-47-30N 018-23-00E
Slupsk		54-25-43N 017-06-25E
Krepcewo		53-16-50N 015-04-00E
Brojce/Pruszcz		53-57-35N 015-18-00E
Chojnice		53-39-23N 017-31-48E
One Bunker Sites (Type A)		
Blotnica		54-06-51N 015-31-28E
Leznica Wielka		51-57-55N 019-10-02E
Gniewino		54-42-05N 018-01-51E
Drobin		52-46-40N 019-48-45E
Powidz		52-25-00N 017-50-10E
One Bunker Sites (Type B)		
Kamien Pomorskie		53-57-57N 014-40-03E
Szczecin		53-21-19N 014-25-20E
Bydgoszcz		53-09-40N 018-05-10E
Chrusciel		54-16-17N 019-49-31E
Zegrze Pomorskie		54-02-30N 016-24-30E
Chwiran		53-14-25N 016-26-20E
SILESIAN MILITARY DISTRICT		
Three-Bunker Sites		
Lask		51-37-05N 019-08-20E
Krosno Odrzanskie		52-01-00N 015-06-00E
Poznan Krezesiny		52-18-20N 016-55-40E
Wroclaw Strachowice		51-03-15N 016-52-16E
Radzionkow		50-25-20N 018-53-20E
One-Bunker Sites (Type A)		
Ligota Dolna		50-28-24N 018-13-05E
Kotla		51-45-30N 016-02-00E
Boleszkowice		52-43-58N 014-35-10E
One-Bunker Sites (Type B)		
Ziebice		50-35-00N 017-05-05E
Dluzyna Dolna		51-14-00N 015-10-05E
Mechnacz		52-33-11N 016-01-40E
Ostrow Wielkopolski		51-39-59N 017-46-19E
Drzensko		52-23-20N 014-46-30E
WARSAW MILITARY DISTRICT		
Three-Bunker Sites		
Lipowiec		53-28-25N 021-08-18E
Sandomierz		50-42-53N 021-40-51E
Warsaw/Bornerowo		52-15-42N 020-52-21E
One-Bunker Sites (Type A)		
Rzeszow		50-10-00N 022-02-45E
One-Bunker Sites (Type B)		
Slawno		51-23-30N 020-07-18E
Okuniew		52-16-30N 021-20-00E
Bialobrzegi		51-40-40N 020-53-40E

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FIGURE 1. LOCATION OF HARDENED EW/GCI RADAR SITES, POLAND

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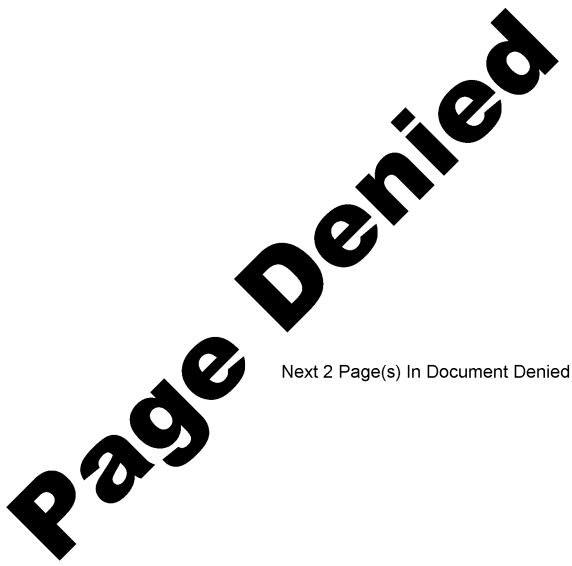

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Equipment

BILL FOLD and NYSA-B

9. The BILL FOLD was the first Polish EW radar screen to be truck mounted. Figure 5 shows the radar screen mounted on the TATRA-111, which is usually seen with a canvas-covered, double-axle antenna/equipment trailer. The antenna is approximately 6.0 meters wide and 4.0 meters high.[1]

10. The NYSA-B antenna is approximately 6.0 meters high and is mounted on a carriage-type van trailer (Figure 6).[3] The NYSA-B height finder and the BILL FOLD (Figure 7) were developed in the same timeframe and are usually deployed together. A van truck with a small, rectangular, and raised section at the rear of the van body roof is the tow vehicle for the NYSA-B. 25X1

FARM GATE and GATE POLE

11. The FARM GATE, which is usually mounted on the TATRA-138, was developed about ten years after the BILL FOLD (Figure 8). The antenna is approximately 9.0 meters wide and 3.0 meters high. A double-axle trailer used for antenna and equipment storage is usually attached to or in the vicinity of the FARM GATE.

12. The GATE POLE (Figure 9) is usually seen with the FARM GATE. The GATE POLE is similar to the NYSA-B but is slightly larger. The antenna is approximately 8.0 meters high . One of the obvious differences between the GATE POLE and the NYSA-B is the antenna supports. The support arms on the GATE POLE cause the antenna to be separated slightly from the body of the trailer. In contrast, the NYSA-B antenna attachment point is on the van body itself. 25X1 25X1

13. The truck that tows the GATE POLE has a raised, rectangular section on the roof of the van (Figure 10). The truck that tows the NYSA-B also has a raised section but it is farther back on the roof.

JAW GATE

14. The JAW GATE system is the latest development in Polish air warning radar equipment (Figure 11). The antenna is mounted on the TATRA-148 chassis.[4] The system includes an antenna truck, two support van trucks, and two double-axle generator trailers. The number of antenna/equipment trailers for the system has not been determined.

15. The JAW GATE antenna truck has a van body with a two-level roof. Two different antennas have been mounted on this truck. One of them is a large screen approximately 17.0 meters wide and 4.0 meters high; the other, seen at Malbork Airfield GCI Radar Site, is a probable FARM GATE. What effect switching antennas has on the capabilities of the system cannot be determined from photography.

Numbers of Radars in Poland

16. According to the EUCOM electronic order of battle, the Poles have the following numbers of their own radars.[5]

	Confirmed	Prob	Tenuous	Total
BILL FOLD	22	7	5	34
NYSA-B	11	5	11	27
FARM GATE	29	10	8	47
GATE POLE	34	8	4	46
JAW GATE	17		3	20

The Poles use their radar equipment for acquisition at SA-2 and SA-3 sites as well as at EW and GCI sites. The equipment is also used in radio technical (EW) battalions, electronic countermeasures air defense units, and antiaircraft artillery regiments. Soviet-built radars including TALL KING, BAR LOCK, LONG TRACK, FLAT FACE, SQUAT EYE, SPOON REST, SIDE NET, and THIN SKIN are also part of the Polish radar inventory.

Radar Site Hardening Program

17. The construction of bunkers to house equipment at EW and GCI radar sites is an ongoing program in Poland. Thirty-six sites have been or are in the process of being hardened (Table 1). There are three basic site patterns: three bunker, single bunker (type A), and single bunker (type B).

Three-Bunker Type

18. Thirteen radar sites have three bunkers (Figure 12). All of these sites have TALL KING radars. The center bunker is approximately 51.0 by 21.0 meters and the flanking bunkers are approximately 30.0 by 21.0 meters. The center bunker has entrances on each of the narrow ends. The two smaller bunkers have entrances along one of the long sides. These two bunkers have seven individual vehicle/equipment bays 25X1

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19. Four of the sites with three bunkers, Slupsk, Wladyslawowo, Radzionkow, and Brojce/Pruszcz, have a special enclosure designed for a BAR LOCK radar (Figure 13). The enclosure is [redacted] Two doors slide to the side when the radar is in the operational position. A probable elevator mechanism is apparently used to raise and lower the BAR LOCK. 25X1

20. An elevator device for a radar is not unique to these four EW/GCI sites. One of the Polish SA-3 sites along the Baltic Coast, Dzinow Gorny SAM Site A08-3, has a LOW BLOW that is raised and lowered in an enclosure.

21. Two of the sites differ slightly from the others. Brojce/Pruszcz and Wladyslawowo sites do not have the large center bunker (Figure 14). Rather, a large, buried building and a five-bay equipment bunker are in the center of the site. The building has several rooms and was built before the adjacent equipment bunker. This difference suggests that these sites possibly have additional control functions. Numerous radars and communications vehicles are also at the Brojce/Pruszcz site.

Single Bunker (Type A)

22. There are nine single-bunker (type A) radar sites (Figure 15). The bunker is approximately 30.0 by 23.0 meters. Entrances to the bunker are at both of the narrow ends. This bunker style was probably the predecessor to the single-bunker (type B) sites (Figure 16) and is no longer being constructed.

Single Bunker (Type B)

23. There are 14 radar sites with a five-bay, drive-in equipment bunker (Figure 17). The bunker is approximately 21.0 meters square. Present trends indicate that more sites will be equipped with this type of bunker.

Summary

24. The development of new Polish EW systems and the radar site hardening program of the 1970s are significant air defense capability improvements. The Poles appear to be making continuous qualitative and quantitative changes in this area.

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REFERENCES

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MAPS OR CHARTS

CIA. Base Map, Series 200, Sheet 502799, scale 1:4,700,000

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REQUIREMENT

Project 143470XL

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List of Conversion Factors by Classification

UNITS OF LENGTH

IF YOU HAVE	*MULTIPLY BY*	*TO OBTAIN*
MILLIMETERS	0.0394	INCHES
CENTIMETERS	0.3937	INCHES
INCHES	25.4000	MILLIMETERS
INCHES	2.5400	CENTIMETERS
FEET	0.3048	METERS
FEET	0.0003	KILOMETERS
YARDS	0.9144	METERS
METERS	3.2808	FEET
METERS	0.0005	MILES(NAUTICAL)
METERS	1.0936	YARDS
KILOMETERS	3280.8400	FEET
KILOMETERS	0.6214	MILES(STATUTE)
KILOMETERS	0.5400	MILES(NAUTICAL)
MILES(STATUTE)	1.6093	KILOMETERS
MILES(NAUTICAL)	6076.1154	FEET
MILES(NAUTICAL)	1.8520	KILOMETERS
MILES(NAUTICAL)	1852.0000	METERS

UNITS OF AREA

IF YOU HAVE	*MULTIPLY BY*	*TO OBTAIN*
SQUARE CENTIMETERS	0.1550	SQUARE INCHES
SQUARE INCHES	6.4516	SQUARE CENTIMETERS
SQUARE FEET	0.0929	SQUARE METERS
SQUARE YARDS	0.8361	SQUARE METERS
SQUARE METERS	10.7639	SQUARE FEET
SQUARE METERS	1.1960	SQUARE YARDS
SQUARE METERS	1.0000	CENTARES
SQUARE METERS	0.0002	ACRES
SQUARE METERS	0.0001	HECTARES
ACRES	4046.8564	SQUARE METERS
ACRES	0.4047	HECTARES
HECTARES	10000.0000	SQUARE METERS
HECTARES	2.4711	ACRES

UNITS OF MASS

IF YOU HAVE	*MULTIPLY BY*	*TO OBTAIN*
KILOGRAMS	2.2046	POUNDS(AVOIR.)
POUNDS(AVOIR.)	0.4536	KILOGRAMS
SHORT TONS	0.9072	METRIC TONS
METRIC TONS	1.1023	SHORT TONS
METRIC TONS	0.9842	LONG TONS
LONG TONS	1.0160	METRIC TONS

UNITS OF VOLUME

IF YOU HAVE	*MULTIPLY BY*	*TO OBTAIN*
LITERS	0.2642	GALLONS
LITERS	0.0063	BARRELS(POL)
LITERS	0.0010	CUBIC METERS
GALLONS	3.7854	LITERS
GALLONS	0.1337	CUBIC FEET
GALLONS	0.0238	BARRELS(POL)
GALLONS	0.0038	CUBIC METERS
BUSHELS	0.0352	CUBIC METERS
CUBIC FEET	7.4805	GALLONS
CUBIC FEET	0.1781	BARRELS(POL)
CUBIC FEET	0.0283	CUBIC METERS
CUBIC YARDS	0.7646	CUBIC METERS
BARRELS(POL)	158.9873	LITERS
BARRELS(POL)	42.0000	GALLONS
BARRELS(POL)	5.6146	CUBIC FEET
BARRELS(POL)	0.1590	CUBIC METERS
CUBIC METERS	1000.0000	LITERS
CUBIC METERS	264.1721	GALLONS
CUBIC METERS	35.3147	CUBIC FEET
CUBIC METERS	28.3776	BUSHELS
CUBIC METERS	6.2898	BARRELS(POL)
CUBIC METERS	1.3080	CUBIC YARDS

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